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10/500,134	12/01/2004	Stephen Lee Davis	46096-17	7377

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EXAMINER	
WU, IVES J	
ART UNIT	**PAPER NUMBER**
1724	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/500,134	DAVIS ET AL.	
	Examiner	Art Unit	
	Ives Wu	1724	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-78* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-78* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/1/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

(1). **Claims 3, 19-32, 66, 68** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 3,19, 22 and 66, 68, it recites: sulphuric acid is in the form of a chelating agent". There is no clear definition for the form of chelating agent in the applicants' teachings. Therefore, it renders indefinite scope of inventive subject matters and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claims 20-21, 23-32 are rejected because they depend on claims 19 and 22.

(2). **Claims 33-50, 69-78** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 33, 44 and 69, it recites: a derivative of a sulphur-based acidic compound". There is no clear definition for the derivative of a sulphur-based acidic compound in the applicants' teachings. Therefore, it renders indefinite scope of inventive subject matters and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claims 34-43, 45-50, 70-78 are rejected because they depend on claims 33, 44 and 69.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

(3). **Claims 1-2, 4-18, 65, 67, 72-75** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukumoto et al (US005231063A) in view of Miller (US005700438A).

As to sulphuric acid at between about 0.1 to 10 % by vol. of solution in a solution for removing a sulphur compound or carbon dioxide from a fluid in **independent claim 1**, Fukumoto et al (US005231063A) disclose composite adsorbent for removing hydrogen sulfide (Abstract). The composite adsorbent comprises an acid salt of an m- or p-aromatic amino acid and an acid (Abstract, line 1-2). The acid includes inorganic acids such as sulfuric acid (Col. 3, line 22-24). In Table 1, Sample No. 3, the sulfuric acid is calculated approximately 7.7 wt% of the solution, which is within the volumetric range as claimed.

As to a metal, at between about 0.05 to 10 wt% of the solution in a solution for removing a sulphur compound or carbon dioxide from a fluid in **independent claim 1**, Fukumoto et al (US005231063A) disclose the adsorbent may further containing a transition metal compound (Abstract, line 2-3). In Table 1, Sample No. 3, the metal (Cupric) is calculated approximately 1.6 wt% of the solution.

As to water in a solution for removing a sulphur compound or carbon dioxide from a fluid in **independent claim 1**, Fukumoto et al (US005231063A) disclose water component in the Examples.

As to an amine, at between about 10 to 80 vol% of the solution for removing a sulphur compound or carbon dioxide from a fluid in **independent claim 1**, Fukumoto et al (US005231063A) disclose acid salt of an m- or p-aromatic amino acid (Abstract, line 1-2). Fukumoto et al **do not teach** amine as claimed.

However, Miller (US005700438A) **teaches** water soluble amine (Abstract, line 3-4).an important feature of the invention is that amount of amine in relation to the source of copper

used to make the amine complex is such that there is present in such solutions between 0.05 to 5 moles of amine (Col. 3, line 55-58). The use of Tris in amount ranging between 0.1 to 4 moles would reads on the volumetric range as claimed.

The advantage of using water soluble amine is to form stable copper complexs yet at the same time be incapable of forming complexes with copper sulfides (Col. 3, line 20-22). Also it is well known in the art that amine based system is used to remove acidic gas component.

Therefore, it would have been obvious at time of the invention to include water soluble amine disclosed by Miller in the composite adsorbent of Fukumoto et al in order to obtain the above-mentioned advantages.

As to limitation of **claim 2**, Fukumoto et al disclose the removal of hydrogen sulfide, methyl mercaptan (Col. 2, line 37-40).

As to limitation of **claims 4-6**, Fukumoto et al disclose copper, zinc, iron and managanese (Col. 3, line 37-38).

As to limitation of **claims 7-8**, Miller discloses examples of water-soluble amines including methyl amine, monoethanol amine (Col. 3, line 32-60).

As to mixture of amine in **claim 9**, it would be obvious to one having ordinary skill I the art at the time the invention was made to use amine mixtures since each member of the combination is known individually as an effective amine and the person of ordinary skill in the art would have expected such a combination to work in an additive or cumulative manner. *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980).

As to limitation of **claims 10-12**, Fukumoto et al disclose, for a better effect, they may be used in the form of solution in an adequate concentration (Col. 3, line 44-45), in the absence of showing criticality of the records, the optimized range of about 0.1 to 2 vol% of sulfuric acid, about 1 to 5 wt% of metal content, about 25 to 50 vol% of amine in the solution in a known process renders *prima facie obviousness* within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

As to limitation of **claims 13-18**, the disclosure of Fukumoto et al, Miller is incorporated herein by reference, the most subject matters as currently claimed, have been recited in applicants' claims 4-9, and have been discussed therein.

As to the sulphuric acid, monoethanolamine, water in a solution **independent claim 65**, the disclosure of Fukumoto et al, Miller is incorporated herein by reference, the most subject matters as currently claimed, have been recited in applicants' claims 1 and 8, and have been discussed therein.

As to the acid/amine solution in **independent claim 65**, the disclosure of Fukumoto et al, Miller meets the requirements of present claim in terms of the materials, it is reasonable to presume the solution of Fukumoto et al, Miller is also acid/amine solution in light of their chemical similarity, the burden is shifted to applicants to establish that the acid/amine solution is not the same or obvious to that set forth by prior arts.

As to limitation of **claims 65** and **67**, in the absence of showing criticality of the records, the optimized range of about 0.1 to 10 vol% of sulfuric acid, about 0.1 to 2 vol% of sulfuric acid, about 10 to 80 vol% of monoethanolamine in the solution in a known process renders *prima facie obviousness* within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

As to limitation of **claims 72-75**, the intended use is not to be considered as limitation and of no significance in the claim construction.

(4). **Claims 3, 19-64, 66, 68-71, 76-78** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukumoto et al (US005231063A) in view of Miller (US005700438A), further in view of website: http://www.cheltec.com/products/products.htm

As to the sulfuric acid being in the form of chelating agent in **claims 3,19** and **66**, Fukumoto et al **do not teach** the sulfuric acid in the form of chelating agent.

However, Cheltec products – Stabitrol is chelated product of sulfuric acid.

The advantage of using Stabitrol – chelated sulfuric acid is to allow for the extended suspension of smallest possible particle size as well as creating more surface area available for interaction- Websites.

Therefore, it would have been obvious at time of the invention to substitute sulfuric acid in chelated form as disclosed by ChelTec for the sulfuric acid in the composite adsorbents of Fukumoto et al in order to obtain the above-mentioned advantage.

As to limitation of **claims 19** and **68**, in the absence of showing criticality of the records, the optimized range of about 01 to 2 vol% of sulfuric acid in a known process renders *prima facie obviousness* within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

As to limitation of **claims 20-21**, the disclosure of Fukumoto et al, Miller is incorporated herein by reference, the most subject matters as currently claimed, have been recited in applicants' claims 11-12, and have been discussed therein.

As to limitation of **independent claim 22**, the disclosure of Fukumoto et al, Miller, ChelTec is incorporated herein by reference, the most subject matters of sulphuric acid in the form of chelating agent, metal, water and amine as currently claimed, have been recited in applicants' claims 1 and 3, and have been discussed therein.

As to the metal/acid mixture being 25 to 75 vol% of the solution, sulphuric acid in chelating agent form being at about 2 vol%, metal content being 1 to 10 wt% and amine at between 10 to 80 vol% in **independent claim 22**, in the absence of showing criticality of the records, the optimized range of about 25 to 75 vol% of metal/acid mixture, about 1 to 10 wt% of metal content, about 10 to 80 vol% of amine in the solution, about 2 vol% of sulfuric acid in a known process renders *prima facie obviousness* within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

As to limitation of **claims 23-32**, the disclosure of Fukumoto et al, Miller, ChelTec is incorporated herein by reference, the most subject matters as currently claims, have been recited in applicants' claims 2, 4-12, and have been discussed therein.

As to limitation of **independent claim 33**, the disclosure of Fukumoto et al, Miller, ChelTec is incorporated herein by reference, the most subject matters of a derivative of a sulphur-based acidic compound (sulphuric acid in the form of chelating agent), metal, water and amine as currently claimed, have been recited in applicants' claims 1 and 3, and have been discussed therein.

As to derivative of sulphur-based acidic compound being at about 0.5 - 10 vol%, metal content being 1 to 10 wt% and amine at between 10 to 80 vol% in **independent claim 33**, in the absence of showing criticality of the records, the optimized range of about 1 to 10 wt% of metal content, about 10 to 80 vol% of amine in the solution, about 0.5 to 10 vol% of a derivative of

sulphur-based acidic compound in a known process renders *prima facie obviousness* within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

As to limitation of **claims 34-40, 42-43**, the disclosure of Fukumoto et al, Miller, ChelTec is incorporated herein by reference, the most subject matters as currently claims, have been recited in applicants' claims 2, 4-9, 11-12, and have been discussed therein.

As to limitation of **claim 41**, Fukumoto et al disclose, for a better effect, they may be used in the form of solution in an adequate concentration (Col. 3, line 44-45), in the absence of showing criticality of the records, the optimized range of about 1.25 to 3.75 vol% of a derivative of sulphur-based acidic compound in the solution in known process renders prima facie obviousness within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

As to limitation of **independent claim 44**, the disclosure of Fukumoto et al, Miller, ChelTec is incorporated herein by reference, the most subject matters of a derivative of a sulphur-based acidic compound (sulphuric acid in the form of chelating agent), metal, water and monoethnaolamine as currently claimed, have been recited in applicants' claims 1, 3, 8 and 41, and have been discussed therein.

As to derivative of sulphur-based acidic compound being at about 1.25 – 3.75 vol%, metal content being 1 to 5 wt% and monoethanolamine at between 25 to 50 vol%, water in **independent claim 44**, in the absence of showing criticality of the records, the optimized range of about 1 to 5 wt% of metal content, about 25 to 50 vol% of monoethanolamine in the solution, about 1.25 to 3.75 vol% of a derivative of sulphur-based acidic compound in a known process renders *prima facie obviousness* within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

As to limitation of **claims 45** and **47**, the disclosure of Fukumoto et al, Miller, ChelTec is incorporated herein by reference, the most subject matters as currently claimed, have been recited in applicants' claims 2 and 4, and have been discussed therein.

As to limitation of **claims 46, 48-50**, in the absence of showing criticality of the records, the optimized range of about 2 to 4 wt% of metal content, about 25, 50 vol% of monoethanolamine in the solution, about 2.5 vol% of a derivative of sulphur-based acidic

compound in a known process renders *prima facie obviousness* within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

As to solution in a method of removing a sulphur compound or carbon dioxide from a fluid in **independent claim 51**, the disclosure of Fukumoto et al, Miller, ChelTec is incorporated herein by reference, the most subject matters of solution as currently claimed, have been recited in any one applicants' previous claims 1-50, and have been discussed therein.

As to the step of preparing a solution in a method in **independent claim 51**, Fukumoto et al disclose the Example 1 for the preparation of such solution.

As to the step of contacting a solution with a fluid in a method in **independent claim 51**, Fukumoto et al disclose the Example 1 for the test of such solution by contacting with such fluid.

As to limitation of **claim 52**, Fukumoto et al disclose the removal of hydrogen sulfide, methyl mercaptan (Col. 2, line 37-40).

As to the fluid to be gas in **claim 53**, fluid to be air in **claim 56**, Fukumoto et al disclose the composite adsorbent effectively removing various offensive odors originating fro industrial and automotive exhaust gas and other smells of tobacco, human body, human waste, food etc. encountered in daily life (Col. 1, line 7-12).

As to limitations of **claims 54, 57-58**, in view of substantially identical solution disclosed by prior arts, and applicants, it would be obvious to treat the liquid fluids such as liquid hydrocarbon, drilling mud as evidenced by Stark (US002723221) that use of chelating agents to improve acid treatment of hydrocarbon streams (Title). Some of these hydrocarbon streams include crude residuums or bottoms from the distillation of crude petroleum, lubricating oil distillate stocks, paraffinic or naphthenic oil fractions produced by the selective solvent extraction of lubricating oil distillates or reduced crudes, viscous hydrocarbon oils resulting from the destructive or non-destructive hydrocarbon of crude oil or fractions thereof, and tar or tar distillates obtained in the cracking of petroleum for the production of motor fuel (Col. 2, line 5-13).

As to the gas to be natural gas in **claim 55**, Miller discloses removal of H_2S in the natural gas (Col. 1, line 15-17).

As to limitation of **claims 59-60**, in view of substantially identical solution disclosed by Fukumoto et al, Miller, ChelTec, and by applicants, it would be obvious to practice the solution

of prior arts at temperature ranged from 0 – 51 °C and –10 to –40 °C for the reasons of enhancing the adsorbing selectivity and saving energy as evidenced by Gazzi et al (US004971607) that the cryogenic process for removal of acidic gases mixture at temperature in the range of –100 to 10 °C (Col. 5, line 6-15).

As to the method in **independent claim 61**, the disclosure of Fukumoto et al, Miller, ChelTec is incorporated herein by reference, the most subject matters of solution, steps as currently claimed, have been recited in any one applicants' previous claims 51, and have been discussed therein.

As to the temperature range performed in the method between 0 to -51 °C in **independent claim 61**, the disclosure of Fukumoto et al, Miller, ChelTec, Gazzi et al is incorporated herein by reference, the most subject matter as currently claimed, has been recited in applicants' claim 59, and has been discussed therein.

As to temperature range from –10 to –40 °C in **claim 62**, from –20 to –40 °C in **claim 63**, from –10 to –30 °C in **claim 64**, in the absence of showing criticality of the records, the optimized temperature range of –10 to –40 °C, -20 to –40 °C, from –10 to –30 °C in a known process renders *prima facie obviousness* within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

As to limitation of **independent claim 69**, the disclosure of Fukumoto et al, Miller, ChelTec is incorporated herein by reference, the most subject matters of a derivative of a sulphur-based compound, monoethanolamine, water as currently claimed, have been recited in applicants' claims 33 and 39, and have been discussed therein.

As to limitation of **claims 69-71**, in the absence of showing criticality of the records, the optimized range of about 10-80 vol% of monoethanolamine, about 25 to 50 vol% of monoethanolamine in the solution, about 0.25 to 10 vol% or about 1.25 to 7.5 vol% of a derivative of sulphur-based acidic compound in a known process renders *prima facie obviousness* within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

As to limitation of **claims 76-78**, the intended use is not to be considered as limitation and of no significance in the claim construction.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ives Wu whose telephone number is 571-272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu
Art Unit: 1724
Date: April 13, 2007

DUANE SMITH
PRIMARY EXAMINER

4-13-07